# TBD02 – (Part 05) ****Proteins****

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. B.2.1 Draw the general formula of 2-amino acids. (1)
   1. How many amino acids are there? Draw the general structure of all amino acids (functional as R):
   2. There are 10 essential and 10 non-essential proteins, explain how this affects complete and incomplete proteins:
2. B.2.2 Describe the characteristic properties of 2-amino acids (2) Properties should include isoelectric point, formation of a zwitterion and buffer action.
   1. What is meant by the formation of a zwitterion?
   2. What is meant by the buffer action of a protein?
   3. What is meant by the isoelectric point?
3. B.2.3 Describe the condensation reaction of 2-amino acids to form polypeptides. (2) Reactions involving up to three amino acids will be assessed.
   1. Show the condensation of any three amino acids
   2. What type of bond is formed between two amino acids? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. Explain the orientation of polypeptide chains (what at the ends called, how are they oriented?):
   4. In terms of the ends, why does the order of amino acids make a difference?
4. B.2.4 Describe and explain the primary, secondary ('-helix and (-pleated sheets), tertiary and quaternary  
   structure of proteins. (3) Include all bonds and interactions (both intramolecular and intermolecular) responsible for the protein structure.
   1. Describe the structure of each, provide structures (drawings) and explanations

|  |  |
| --- | --- |
|  | **Structure, explanation, bonding, etc** |
| **Primary** |  |
| **Secondary** | What part of the peptide chain is responsible for secondary features? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Tertiary** | What part of the peptide chain is responsible for tertiary features? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Quaternary** |  |

1. B.2.5 Explain how proteins can be analysed by chromatography and electrophoresis. (3)
   1. There are two methods of analysing proteins, describe each below:

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| --- | --- | --- |
|  | **Explanation** | **Draw the set up or result** |
| **Chromatograph** |  |  |
| **Electrophoresis** |  |  |

1. B.2.6 List the major functions of proteins in the body. (1) Include structural proteins (for example, collagen), enzymes, hormones (for example, insulin), immunoproteins (antibodies), transport proteins (for example, hemoglobin) and as an energy source.
   1. What is the difference between structural and functional proteins? What type of tertiary structure (globular, fibrous) are associated with each?
   2. List how proteins are crucial components for basic life processes:
   3. What is the immunoprotein function?
   4. What is the hormone function?